

The LABrynth

Indiana State Department of Health Laboratories Newsletter

Salmonella Javiana Outbreak

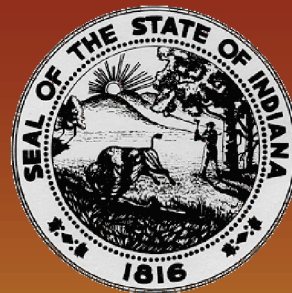
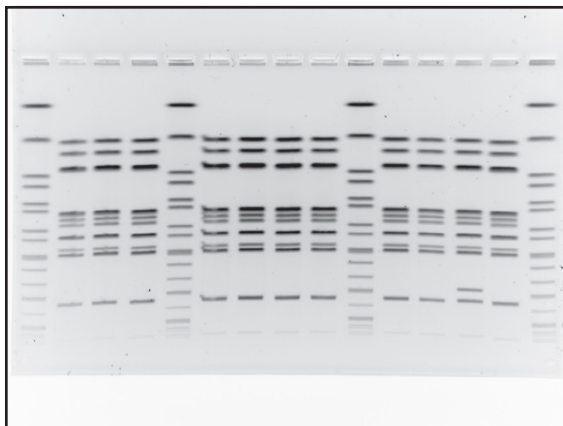
By Mark Forster

It was not the record-setting volume of salmonella samples that stood out most to those working in the Pulsed-field gel electrophoresis (PFGE) laboratory this summer – a typically busy season. It was the enormous outbreak of Salmonella Javiana infections cropping up amongst Indiana residents and beyond.

Standardized PFGE has long been the benchmark for molecular detection of food borne disease outbreaks and it provides hard evidence linking outbreaks to contaminated food. When PFGE showed in July that a large cluster of related salmonella infections was growing larger, it provoked a widespread investigation that was headed up by the Centers for Disease Control and Prevention (CDC) to unearth and abolish the causal link. PFGE is a molecular biology technique used to produce a DNA fingerprint (PFGE pattern) of food borne disease-causing bacteria isolated from sick patients. The bacteria's fingerprints are shared by a national network of participating laboratories through a dynamic online database and scanned for matches. A group, or cluster, of matching PFGE patterns indicates a probable common source of infection, usually a food product. Epidemiologists, or disease detectives, use the PFGE cluster to prioritize patient investigations and group their data for analysis, ideally implicating a food source. A matching DNA fingerprint developed from the implicated food source links the food to the cluster.

Although the PFGE lab expected another busy summer, no one predicted the large outbreak of Salmonella Javiana experienced throughout July and August. A record-setting 327 salmonella PFGE patterns were uploaded to the PulseNet national database in the three-month period from June to August this year; up from the previous record of 226 set last year. Salmonella Javiana, normally 2% of the salmonellas tested, suddenly became prevalent; representing 50% of the salmonella tested in the month of July at the ISDH labs. What's more, PFGE fingerprinting confirmed that an unprecedented 76 of the Javiana infections were likely related. By the end of August, 100 matching Javiana fingerprints had been uncovered in Indiana alone and the multi-state outbreak investigation is still on going. Working together, ISDH epidemiologists, the CDC and other states' health organizations tailored questionnaires and gathered detailed food histories from patients clustered by PFGE pattern matching. Despite this collaboration and effort, the results have been confounding. At this time, no food source has been implicated and no elucidating food or environmental samples have been discovered. All told, 305 patients scattered throughout 26 states contributed matching PFGE patterns to the mystery.

Right: This is a picture of PFGE pattern of the salmonella bacteria. Each band represents DNA fragments.



Indiana State Department of Health Laboratories

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State Health Commissioner

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Deputy State Health Commissioner

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Assistant Commissioner
& ISDH Lab Director

Our Mission:

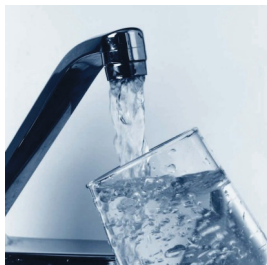
The Indiana State Department of Health Laboratories partners with other public health agencies to provide timely and accurate information needed for surveillance and outbreak investigations to protect and improve Hoosier health.

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Drop by Drop: Protecting Indiana's Water Supply

by Phil Zillinger, ISDH Chemist



Earlier this year, the Chemistry Laboratories were asked to provide assistance in the preparation of a documentary, *Drop by Drop: Protecting Indiana's Water Supply*, by WFYI, the Indianapolis public broadcasting station. The laboratory provided testing of water samples for arsenic and footage of instrumentation used for drinking water testing in use. The documentary tells the story of a mobile home park in eastern Indiana that was found to have water which was not safe for drinking. It took several years and the perseverance of residents, regulators, and legislators to get the mobile home park connected to a public water system. Also included in the documentary are clips showing the sources of drinking water, how water is treated before it enters the distribution system and ways to protect the sources of drinking water. The documentary is being shown on

WFYI and may be available on other public broadcasting stations in the future. If you are interested in getting a copy of the DVD for your use, you can contact WFYI, 317-636-2020.

ISDH Laboratories Hosts Hands-On Workshop for Sentinel Laboratories

By Shelley Matheson



Mark Glazier shows the trainees how to correctly handle the specimens.

ISDH Laboratories hosted a training course titled, "Hands-On Workshop for Sentinel Laboratories: Biothreat Agents 101" on July 15, 2010 at Deaconess Hospital in Evansville. Twelve participants represented eight different Indiana sentinel hospital laboratories. A sentinel laboratory is defined as any laboratory capable of analyzing or referring specimens or samples that may contain microbial agents or biological toxins. In conjunction with reference laboratories, these sentinel laboratories form the nation's Laboratory Response Network (LRN).

The workshop provided sentinel laboratorians with an overview of their role in the presumptive identification of biothreat agents including *Bacillus anthracis*, *Yersinia pestis*, *Brucella canis*, *Francisella tularensis*, *Burkholderia mallei*, and *Burkholderia pseudomallei*. Hands-on laboratory exercises outlining the microbiology of these agents were demonstrated in our "state-of-the-art" training laboratory. The safety implications of handling these suspect organisms were emphasized, as well as select agent policies and packaging & shipping rules and regulations. Shelley Matheson, ISDH Laboratory State Training Coordinator, presented "The Role

of the Sentinel Lab", "Select Agents, CDC/APHIS Forms, and USDA Permit Information for Sentinel Labs", and "Packaging and Shipping of Category A Infectious Substances." Mark Glazier, ISDH Laboratory Supervisor of Emergency Preparedness and Molecular Virology, presented "Agents of Bioterrorism: An Overview of Sentinel Laboratory Protocols" and "Biosafety Decisions in the Clinical Microbiology Laboratory."

Additionally, other ISDH Laboratory staff members were essential to the success of the training. This included Liz Church, ISDH Hospital Laboratory Training Coordinator and Brent Barrett, ISDH Laboratory Medical Microbiologist. Liz and Brent assisted in the coordination and planning of the training, the production of the workshop, and also as technical experts in the hands-on laboratory portion.

Overall, the workshop was a successful training experience for all staff and participants in attendance. A pre-test and post-test were given to each participant to evaluate the educational value of the training. We are pleased to announce that there was an average of a 21 percent increase in test scores between the pre-test and the post-test for participants. According to the participant evaluations, ISDH Laboratories were 100 percent successful in meeting all of the course objectives. One participant commented "Wonderful! Mark and Shelley were very helpful!" Another participant stated there was "excellent friendliness and helpfulness from ISDH staff."

The next hands-on training will be presented in the beginning of 2011.

ISDH Laboratories Host Group from the People's Republic of China

By Dr. Judith Lovchik and Kirsten Long

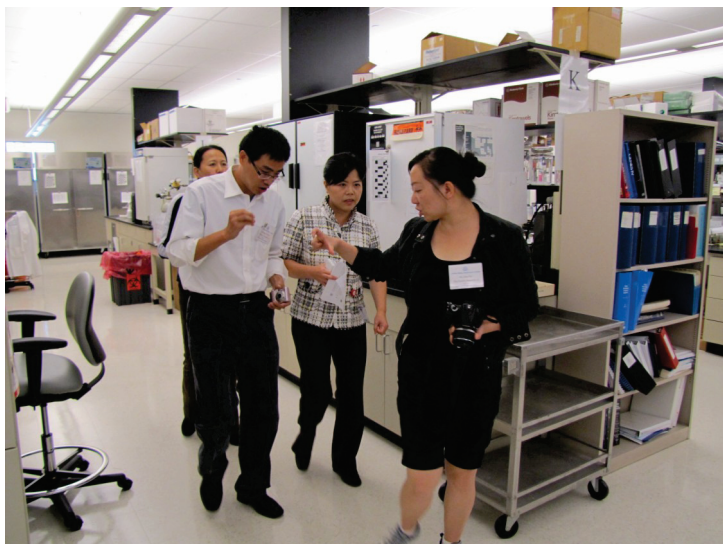


Dr. Lixia Liu and Dr. Judith Lovchik poses with the visitors from People's Republic of China.

Twelve visitors from People's Republic of China, plus three translators and a representative from our State Department visited the Indiana State Department of Health Laboratories on September 23rd. Scott Gilliam and Travis Goodman from Food Protection presented regulatory information, while Amie May from Enteric Epidemiology and Robin Bruner presented the story of how Epidemiology and the Laboratories collaborate to solve state and national food borne outbreaks. Dr. Hesham Elgaali answered their questions about Food Microbiology, and Dr. Lixia Liu gave information about the Enterics Laboratory. Dr. Grace Chi and Miao Xu provided additional information and technical translation during the visit and the laboratory tour, led by Robin, Hesham, and Lixia. Special thanks to Mary Robinson, Aukisha Dillard, Christine Whitaker, and Ray Beebe, who provided logistical support.

These scientists and quality control administrators were invited to the United States by the Department of State's International Visitor Leadership Program. They are touring different laboratories, inspection offices, food processing facilities, and governmental facilities nationwide. The visit lasted from September 13-October 1, 2010. Some objectives of the project are as follows:

- Examine the roles various federal government offices play in food and product safety regulation;
- Gain exposure to state-level agriculture farm inspection and aquaculture offices and observe compliance measures;
- Investigate U.S. inspection and quarantine regulations, management, and administration as well as the practices of commodity import and export inspection;
- Learn about food and product safety risk management, mitigation, evaluation, and resolution, and the processes by which potential and real risk is communicated to the American public;
- Visit food-processing facilities to explore issues such as organizational compliance, building quality, safety systems, and technology involved in ensuring that safety standards are followed; and
- Explore and learn about the role of NGOs working in the field of food and product safety and the relationship with consumer involvement.



Dr. Lixia Liu shows the visitors around the ISDH Microbiology laboratory.

Around the world

New strains of antibiotic resistant bacteria discovered: A new strain of antibiotic resistant enterobacteria was discovered recently, carrying a gene named NDM-1. It originated from the Indian subcontinent and has been spread by travelers who went to India for medical treatment. The gene, which can be transferred between different strains of enterobacteria (typically *Klebsiella pneumoniae*), makes the bacteria resistant to nearly all antibiotics on market. The strains of bacteria carrying the gene still account for only a tiny fraction of infections, but it has spread rapidly around the globe. This new strain has been reported in 35 states at last count. It is considered to be a major threat to our collective health, as our last frontier of defense, antibiotics, becomes ineffective.

Salmonella outbreak in eggs: A salmonella outbreak in August and September linked to eggs caused more than 1,600 people to become sick. It prompted a nationwide egg recall, of which more than 550 million eggs were recalled. The outbreak was traced to two egg farms in Iowa. Inspectors believe that the eggs were tainted by unsanitary conditions at the farms and contaminated chicken feed.



Wisconsin State Laboratory of Hygiene invites ISDH Laboratories to participate in FPPT Test Program

Because of participation in the National Blood Lead Proficiency Testing Program (NBLPT), the Wisconsin State Laboratory of Hygiene has invited the ISDH laboratories to serve the filter paper proficiency test program (FPPT) in a referee capacity.

The FPPT program is for laboratories testing dried blood spots on filter paper for blood lead concentration. The FPPT program utilizes referee laboratories that test liquid blood specimens to establish the target values. Referee samples will be provided twice a year, probably in August and February, with a total of 24 specimens per year. The samples consist of fresh human blood, but are otherwise very similar to those employed in the NBLPT program with respect to handling and analysis.

Director Attends 2010 International Conference on Emerging Infectious Diseases (ICEID)

Dr. Judy Lovchik, Director and Assistant Commissioner of Laboratory Services, attended the ICEID meeting in Atlanta from July 11 to July 14, 2010, along with Pam Pontones, State Epidemiologist, and Dr. Jennifer House, Veterinary Epidemiologist. This biannual meeting is organized by CDC, Council of State and Territorial Epidemiologists, Association of Public Health Laboratories (APHL), World Health Organization (WHO), and American Society for Microbiology (ASM).

Dr. Tom Frieden, CDC Director, Dr. Tony Fauci, NIAID Director, and Dr. Keiji Fukuda, WHO Pandemic Influenza Advisor, spoke at the opening session. The latter presentation was fresh and informative. Dr. Frieden presented his pyramid of public health vision, which provoked some controversy about the relative unimportance of counseling and education efforts.

One of the more interesting sessions was Interventions and Diagnostics: an Open Discussion of Issues and Perspectives, moderated by Dr. Joanne Bartkus, Director for Minnesota Public Health Laboratory, and Scott Becker, Executive Director for APHL. It was a panel including an Infectious Disease Practitioner, an Epidemiologist, and Clinical Laboratory Director, CDC's HIV Prevention Director, and a corporate diagnostic developer. Each discussed public health testing from his/her own perspective.

Report on Attendance at FDA 50 State Workshop – A United Approach to Public Health (August 17-19, 2010, Denver, CO)

Travis Goodman of the ISDH Food Protection Program and Tom Cronau of the ISDH labs attended a FDA sponsored two and half day workshop conducted in Denver, Colorado on August 17-19, 2010. This was the third in a series of 50 State Workshops that have been sponsored by the FDA. The first was held in St. Louis in 2008 where general goals were set, followed by a second held in Kansas City where specific projects were set and committees created. This third meeting's purpose was to discuss the outcomes of each project and to identify, utilizing breakout sessions, future goals and the problems and solutions to reaching them.

Included in the approximately 273 attendees were at least one representative from each of the 50 States, Guam, Puerto Rico, and Washington, D.C. The Federal agencies represented included the U.S. Food and Drug Administration (FDA), United States Department of Agriculture (USDA) Food Safety and Inspection Service (FSIS), Department of Homeland Security (DHS), Centers for Disease Control and Prevention (CDC), Environmental Protection Agency (EPA), and the Indian Health Service.

Organizations/associations including the National Association of County and City Health Officials (NACCHO), Association of Food and Drug Officials (AFDO), National Association of Local Boards of Health (NALBOH), Association of American Feed Control Officials (AAFCO), Association of State and Territorial Health Officials (ASTHO), Association of Public Health Laboratories (APHL) and the Council of State and Territorial Epidemiologists (CSTE) were represented. The FDA went to great effort to identify and invite the participants necessary to make a unified approach to public health a reality.

A key outcome of the workshop was the recognition of past and present successful efforts in the development of a united system for ensuring food safety from farm to table nationwide. The Incident Command System (ICS) was often described as a practical and effective means of conducting outbreak investigations, regardless of size and scope, and to coordinate multi-agency inspections. Goals and projects were proposed for the next two years to continue the work towards a united approach to public health. The ISDH has been volunteered to participate on the committee addressing laboratory issues.

Real-Time PCR Instrumentation Training

Jim Kirkman, microbiologist in the Food & Dairy lab, attended a course in Phoenix, Arizona on August 10-12, 2010 titled "Real-Time PCR Instrumentation". The objectives of this course were to obtain hands-on experience with multiple real-time PCR instruments and commercially available real-time PCR assays. We discussed how real-time PCR assays are used within the FERN and how to assist laboratories with little or no real-time PCR capability make informed decisions on which instrumentation would be most useful in their laboratories.

CDC Diagnostic Mycobacteriology Training— Atlanta, GA

From August 17th through August 20th Laura Taube, microbiologist in the ISDH Tuberculosis lab, attended the "Diagnostic Mycobacteriology" class at the CDC in Atlanta, GA. The course included lectures on conventional and new Mycobacteriology methods of identification including molecular methods. Some of the molecular methods are FDA approved (Amplified M. tuberculosis Direct Test Gen-Probe Inc; Amplicor M. tuberculosis Roche Diagnostics) and non FDA approved (Hain-Line probe assay and lab developed real time PCR assays). It also covered quality assurance and safety. The course examined different methods for identifying drug susceptibility such as real time PCR and commercially available assays. We also learned about the epidemiology of TB, both in the US and globally. We discussed non-TB Mycobacterium and the importance of identification species after determining that it is not TB. The course provided a wonderful opportunity to meet with other microbiologists and discuss their laboratory methods, challenges and successes.

What's Happening at ISDH Labs?

ISDH 2010 Annual Cookout



Chris Grimes tries to convince Engra Castiglione that the hot dogs are good.

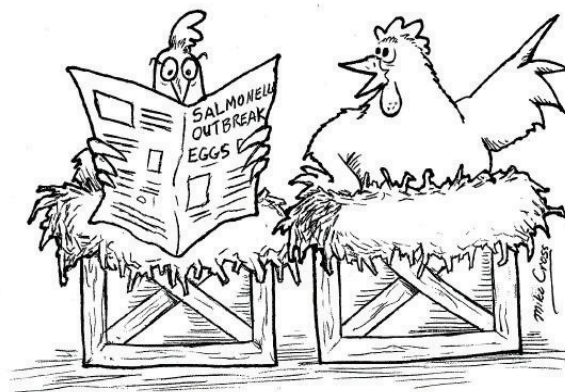
To celebrate a year of successful inspections and audits, the ISDH Laboratories hosted a cookout. The menu featured grilled burgers and hot dogs, potato salad, baked beans, and chips. It was a sunny and beautiful day as many employees went outside the building to enjoy the delicious food!



Fun Corner



Come and get your vittles!



"I'm worried about this Salmonella outbreak... we are going to be out of jobs soon!"

**ISDH Laboratory Employee Spotlight:
Michael Cross**

Michael Cross works as a microbiologist at ISDH on the serology testing team. Most of the time he perform tests for HIV and Hepatitis, but he does some work in other areas when needed. Outside of the lab, he spends his time doing various types of art. His sculptures, cartoons, and illustration work has a small but growing worldwide following.

He is married to Evelyn with two children, Kayla and Daniel. He enjoys gardening, hiking, reading, weightlifting, and video games.

**ISDH Laboratory Employee Spotlight:
Kirsten Long**

Kirsten is actually a re-hire employee. She started in the STD testing laboratory six years ago and then moved to the Molecular biology lab. She left to go to Mid America Clinical Labs and try her hand at medical microbiology for a few years. Since she's been back at ISDH, she has been trained in serology and most recently transferred to the

Enterics area. As you can see, Kirsten likes to learn new and interesting aspects of the biological sciences. At home, Kirsten enjoys reading novels, flower gardening, cross-stitching, and watching movies. She has been married for 7 years to her husband, Rich, and has two little girls, Brianna and Juliette.

The LABrynth

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